Protective and Risk Factors Associated With Voice Strain Among Teachers in Castile and Leon, Spain: Recommendations for Voice Training

Factores de Riesgo y Protección de los Tratamientos Foniátricos en Docentes de Castilla y León: Pautas para la Formación Vocal

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Summary: Objectives. The aim of this research was to know the protective and risk factors associated with voice strain in teachers.

Method and Study Design. A total of 675 teachers from Castille and León, Spain took part in the research within an age range between 23 and 66 years (from nursery school to university). A cross-sectional, descriptive, and analytic design was applied to data from a self-administered questionnaire.

Results. The research showed that 16.4% had suffered some voice disorder and a remarkable percentage had never received any kind of voice training. The bivariate and multivariate analyses show that the size of the classroom, being a primary school teacher, teaching physical education, the noise caused by the students in the classroom, the struggle to keep the order within the class, raising the voice, and bad sleep are risk factors in the voice disorders. Each learning stage features a different risk factor, namely in nursery school, the noise caused by the pupils; in primary education, raising the voice; and in secondary education, the struggle to keep the order within the class. All these risk factors are linked with each other.

Conclusions. The preventive measures must provide adequate answers to the voice requirements for every subject and stage, and these preventive measures must be based on the educational psychology principles to help the teachers deal with the problems originated by the lack of authority or the noise made by the students, using the proper voice techniques.

Key Words: Phoniatric pathology–Teachers–Protective and risk factors–Voice training.

INTRODUCTION

Several researchers confirmed years ago that there is an intrinsic relationship between voice-related problems and teaching.[1–5] Nevertheless, despite the scientific evidence, the voice-related disorders in the teaching profession appear, in Spain, in a recent list of occupational illnesses, although they did not enter into force until January 1, 2007.[6]

Different studies[2,7–14] have noted the high prevalence of voice disorders among professional teachers, fluctuating between 17% and 63%, reaching an high of 80%. The review performed by Garcia et al[14] confirmed the high prevalence of voice disorders in teachers, for whom it is two- to three-fold more frequent than for the general population. As other authors[15,16] have indicated, the prevalence of voice disorders among teachers varies significantly owing to the different sampling procedures, the different operationality of the voice problem variable, the methodological strategies used to detect the presence of a phoniatric disorder, the different ways of recording these disorders, and the increase in voice disorders over recent years.

In response to this situation, it was necessary to know what the protective and the risk factors were in the face of possible voice problems. All of these were with a view to developing programs with the objective of endowing students and professional teachers with a larger amount of positive and healthy resources and practices, both in the field of work and in their personal life.

Aspects related to voice pathologies were divided into different factors to give the investigation clear boundaries, namely sociodemographic characteristics, working conditions, class management techniques, voice training, and certain healthy habits.

Among various sociodemographic characteristics, most studies[2,10,17–23] have shown that the prevalence of phoniatric disorders is higher in women than in men. Some authors[18,24] explain that women have a smaller larynx and the vibration frequencies of their vocal folds are higher than men, which itself is a cause of more voice disorders.

With regard to working conditions, the educational level at which teachers exercise their profession, their years as a teacher, the subject matter they teach, the number of weekly teaching hours, and the number of students in the class have all been studied.

Studies have found that, in general, nursery, primary, and secondary school teachers are those presenting the highest rate of voice pathologies, whereas the prevalence of this type of disorder among university teachers is less frequent.[15,22,25,26] Among

Accepted for publication August 11, 2014.

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Journal of Voice, Vol. 29, No. 2, pp. 261.e1-261.e12

0892-1997/$36.00

http://dx.doi.org/10.1016/j.jvoice.2014.08.005

the possible causes, Gañet et al[10] argue that voice strain in the university setting is less prevalent owing to the reduced number of classroom hours and the age of the students.

It is generally accepted that vocal performance decreases with age, especially among voice strained professions, which may lead to occupational dysphonia throughout the teaching years. However, two studies[27] pointed out that there is no unanimity over the years of teaching experience. Some researchers[4,10,28] found that the longer the length of service, the greater the prevalence of teachers with the symptoms of voice-related disorders, although length of service might also be a protective factor, as classroom practice could always improve with experience. Accordingly, Kooijman et al[29] confirmed a decrease of voice complaints during the career of the teachers. On the other hand, authors such as Chen et al,[30] Preciado et al,[11] or Tavares and Martins[31] stated that the age and years spent teaching had no cumulative effect on voice disorders among teaching staff.

If we look at teaching load, a great number of researchers[26,31–33] noted that dysphonic patients had more classroom hours a week than nondysphonic patients. Nevertheless, there is no agreement on this variable. In other studies,[10,28,34] teaching load was not associated with phoniatric pathologies.

The referenced literature underlines that the appearance of dysphonias is strongly associated with the teaching of certain subjects, such as foreign languages, language and literature, mathematics, music, and physical education.[4,16,22] According to Preciado,[26] the increase of voice disorders among teachers of language and literature and foreign languages is owing to the predominance of oral over written work in the classroom. Mathematics teachers put a lot of information on the blackboard and (in the absence of interactive whiteboards) inhale a lot of chalk dust, which deposits itself on the laryngeal mucous complicating the lubrication of the larynx and exacerbating symptoms of irritation, coughing, and "rasping," thereby increasing phonatory voice disorders. With regard to music teachers, they are more likely to suffer frequent voice disorders because of inappropriate changes from song to the spoken word. Cantor Cutiva et al[27] noted that several publications consistently observed that physical education teachers reported voice disorders more often than teachers of other subjects. A possible explanation is that those teachers are forced to work in open or very roomy places with poor acoustics as well as talking, while demonstrating the exercises, being both damaging factors for the voice.

The number of students in the classroom has been marked by several authors as a risk factor for voice problems.[14,23,26,29,31] The study performed by Preciado[26] stated that at the level of nursery education and the first years of primary education, dysphonic teachers had a higher number of students than nondysphonic teachers. Urrutikoetxea et al[13] considered that having a lower number of students in class might suppose less voice exertion.

The way teachers perceive noise generated by students in the classroom and their capability to maintain order in the classroom, as well as the phonatory techniques they used to capture the attention of students also appear to play an important role in voice problems.

It is understood that one among other factors that contributes to the development of dysphonia among teachers is a noisy environment.[1,14,22,23,27,33,35–40] Adverse acoustic conditions in school rooms (inappropriate materials of walls, ceilings and floors that propagate noise and reverberations, not using voice amplification to decrease phonotory overload, and so on…) and the students themselves, either because of their age or because of their behavior, may all be the sources of noise. On numerous occasions, the noisy environment is so strong that teachers raise their voices above the recommended level of decibels (from 58 to 90.5 dB), which involves an important risk of suffering vocal cord injuries.[14,41]

Likewise, many authors[16,28,42] have recognized that a lack of classroom behavioral management is linked to the development of voice disorders. In the study by Hernández,[43] when discipline is poor, the teacher will be four times more likely to suffer from dysphonia, probably because teachers resorted to ineffective techniques to maintain order, such as forcing the voice or shouting. It has been seen that this type of phonatory practice is very common among teachers, as they do not know how to use natural resonances in an effective way, all too often injuring their vocal ligaments.[44] Diverse studies[2,26,27,30,36,45,46] confirmed that voice strain and being loud among teachers is one of the main causes of voice-related pathologies.

Hence, numerous researchers[7,28,47–49] recommend training in phonoaudiological techniques to teach the necessary skills to manage the voice in an acceptable way and, thus, to prevent possible problems with the vocal cords. However, Gassull et al[50] indicate that voice training for students and professional teachers in Universities is scarce. Various authors have noted that teachers possess few corporal and voice-related resources, such as training on speech disorders,[20] postural alignment for voice production,[51] or vocal function exercises, resonant voice exercises, relaxation, and yoga techniques,[52,53] which leaves them with insufficient techniques to attend to and to satisfy such exhausting and rigorous voice-related needs that the teaching profession requires.[54]

With regard to healthy habits, numerous investigations[38,43,46,55] have identified excessive smoking and alcohol consumption as important risk factors for dysphonia because these two habits, either together or separately, produce less hydration of the respiratory tract, slight edema in the vocal cords, and reddening and irritation of the respiratory mucous.

Neither does a definitive agreement exist between experts on the efficacy of the principal protective measures to counter voice disorders among professional voice users such as the example of healthy life styles (food, physical exercise, and so on).[56] However, sleep disorders are further health-related habits associated with the emergence of morbid phoniatric symptoms.[46] It appears that sleep facilitates recovery.[10]

For all these reasons, the objectives of this study are, on the one hand, to analyze the relation that exists between these aspects and phoniatric disorders among teachers. On the other hand, it establishes both the protective and the risk factors that best predict the emergence of voice pathologies among teaching professionals. Finally, it suggests a series of lines of action to contribute to the prevention of voice disorders among teachers.